



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/812,276	03/20/2001	Michio Horiuchi	072-01	2361

7590 05/02/2002

Paul & Paul
2900 Two Thousand Market Street
Philadelphia, PA 19103

EXAMINER

COSTANZO, PATRICIA M

ART UNIT	PAPER NUMBER
----------	--------------

2811

DATE MAILED: 05/02/2002

Le

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/812,276

Applicant(s)

HORIUCHI ET AL.

Examiner

Patricia M. Costanzo

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 38 is/are pending in the application.
- 4a) Of the above claim(s) 1 - 19, 23 - 26, 28 - 38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 20 - 22 and 27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restriction

1. Applicant's election with traverse of Embodiment 8 of the semiconductor device product as shown in Figures 29 – 31, with Claims 20 – 22 and 27 readable thereon, in Paper No. 5, filed on March 5, 2002, is acknowledged. The traversal is on the ground(s) that “. . . in the interest of efficiency, both on the part of the Office and on the part of the applicant, all of the claims in this application should be examined together, in that there is undoubtedly some overlap in the areas of search directed to the different species and the semiconductor devices and the process of producing them.

This argument is found not persuasive because the areas of search directed to the different species and the semiconductor devices and the process of producing them involve searching different extensive patent classes and subclasses and would constitute a serious examination burden.

The requirement is still deemed proper and is therefore made FINAL.

Specification

2. The abstract of the disclosure is objected to because it contains too many words. An Abstract filed under 35 U.S.C. 111 may not exceed 150 words in length.

Correction is required. See MPEP § 608.01(b).

Art Unit: 2811

3. The disclosure is objected to because of the following informalities:
- page 5, line 5: phrase "and in the solder resist layer" does not make any sense;
- page 7, line 17 – 21: sentence does not make sense;
- page 38, line 15: is "resin member 129" supposed to be "resin member 124"?

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. Claims 20, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 5,892,271 (Takeda *et al.*) (see Figures 1 - 11 and respective portions of the Takeda *et al.* specification) in view of United States Patent No. 6,060,771 (Tomikawa *et al.*) (see Figures 1 - 2 and respective portions of the Tomikawa specification).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting

Referring to Claim 20: Takeda et al. disclose a semiconductor device comprising:

- a resin member of a predetermined thickness (see, for example, Figure 8 (19));

- a semiconductor element (1) having an active surface facing downward;

- metal interconnections (see, for example, Figure 8, (6) and (13)) formed on the bottom surface of the resin member (see, for example, (19)); and

- connection terminals ((2) and (3)) extending downward from the active surface of the semiconductor element and having bottom ends connected to top surfaces of said metal interconnections (see, for example, the connections as illustrated in Figure 8).

Takeda et al. do not explicitly disclose that the semiconductor element (1) is sealed "inside" said resin member and has a back surface exposed at a top surface of said resin member. Note that Takeda et al. do, however, teach a resin coating over the bottom side of the semiconductor to seal the electrode surface of the chip inside of the coating (see, for example, Col. 7, lines 9 – 13) so that the back surface of the chip is exposed. What is missing from Takeda et al. is simply the application of resin to the sides of the chip.

Tomikawa et al. disclose a semiconductor device where the semiconductor element (1) is sealed inside resin member (8) and where

semiconductor element (1) has a back surface exposed at a top surface of said resin member (see, for example, Tomikawa et al., Figure 1).

It would have been obvious to those of ordinary skill in the art at the time the invention was made to modify the device disclosed by Takeda et al. by providing for the disclosed resin coating to extend up the sides of the chip as disclosed by Tomikawa et al. to obtain the advantage of protecting the chip from the detrimental effects of its immediate working environment, such as moisture and debris.

Referring to Claim 21: The proposed device of Takeda et al. and Tomikawa et al. discloses a semiconductor device, as recited above, further disclosing wherein the top surface of said sealing resin layer and the back surface of said semiconductor element form substantially the same plane (see, for example, Tomikawa et al., Figure 1).

Referring to Claim 22: The proposed device of Takeda et al. and Tomikawa et al. discloses a semiconductor device, as recited above, further disclosing wherein the device is provided with a solder resist layer covering the entire bottom surface of said resin member including said metal interconnections and connection bumps formed on the bottom surfaces of said metal interconnections, passing through said solder resist layer, and projecting downward (see, for example, Takeda et al., Figure 8, (15) and Col. 7, lines 13 - 17).

Art Unit: 2811

6. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 5,892,271 (Takeda *et al.*) (see Figures 1 - 11 and respective portions of the Takeda *et al.* specification) in view of United States Patent No. 6,060,771 (Tomikawa *et al.*) (see Figures 1 - 2 and respective portions of the Tomikawa specification) and further in view of United States Patent No. 6,023,096 (Hotta *et al.*) (see Figures 1 - 5 and respective portions of the Hotta *et al.* specification).

The proposed device of Takeda *et al.* and Tomikawa *et al.* disclose a semiconductor device, as recited above, except for explicitly disclosing wherein an inorganic filler is dispersed in said resin member.

Hotta *et al.* disclose a semiconductor device similar to the device recited above, and also discloses inorganic filler dispersed in the resin member (see, for example, Hotta *et al.*, Col. 5, line 54 - 65).

It would have been obvious to those of ordinary skill in the art at the time the invention was made to modify the device disclosed by Takeda *et al.* and Tomikawa *et al.* by providing for an inorganic filler is dispersed in said resin member as disclosed by Hotta *et al.* to obtain the advantage of protecting the chip from the effects of differential thermal expansion which would more likely occur if a resin was used without a filler.

Art Unit: 2811

Conclusion

Any inquiry concerning this communication should be directed to Patricia Costanzo at 703 305-5675 on Monday – Friday from 8:00 A.M. – 5:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful Supervisory Primary Examiner Tom Thomas can be reached at 703 308 -2772.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist at 703 308-095.

Using facsimile machines to transmit correspondence is encouraged. The official Technical Center 2800 before-final FAX number is 703-872-9318 and the after-final FAX number is 703-872-9319. These FAX numbers will provide the FAX sender with an auto-reply verifying receipt of their FAX by the United States Patent and Trademark Office. If there should be a problem while faxing to the Office, please contact Technical Center 2800 Customer Service at 703-306-3329.

pmc
April 29, 2002

Steven Loko
Primary Examiner
Steven Loko

